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P A P E R S

I N

A G R I C U L T U R E.

AGRICULTURE.

THE GOLD MEDAL, being the Premium offered for having set, between the first of October 1789, and the first of April 1790, the greatest quantity of Strong Land with Acorns, and the Seeds or Cuttings of other Trees, was this year adjudged to WILLIAM JOHNSON, of Petworth, in Suffex, Esq. from whom the following Account and Certificate were received.

S I R,

I AM to intreat the favour of you to lay the following Certificate before the Society for the Encouragement of Arts, Manufactures, and Commerce.

It hath been hinted to me, that I put myself to unnecessary expence, by setting

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my

4 AGRICULTURE.

my Acorns and planting my plants thicker or nearer together than is necessary; but having in the year 1769 planted about four acres exactly after the same manner, and in 1771 having planted five acres more in the same way, and those plantations having succeeded to admiration, I thought it right to pursue the same method on the present occasion.

That mice and other vermin destroy a great many of the Acorns, and that in an unkind season many perish in the ground, every person must suppose: these, amongst other reasons, induced me to set my Acorns so near together.

At the end of two years (after planting) I cut off the Forest-plants, in order to strengthen the roots, and to make them produce more shoots; which effect it had, besides letting the air in upon the young Oaks.

I have never suffered my Underwoods to stand above eight years uncut, to prevent their
their

AGRICULTURE. §

their drawing up the young Oaks too tenderly: and every purpose seems to have been answered; for I have, in the two small plantations above mentioned, as fine young Oaks and Underwoods as are to be seen any where in this part of the country.

Oaks, when they get large, should stand at least thirty feet apart: but in order to have good ones, at proper distances from each other, it is necessary to raise them thick at first, and to lessen the number every time the Underwoods are cut; by which means there is an opportunity of saving the strongest Saplings, and those that are best placed for standing.

Draining I hold very necessary, having observed that in two places, where the water hath been suffered to stand, the Oaks never prosper.

The Alders mentioned in the Certificate were (of course) planted on the low wet ground (about six acres); the Birch, Ash,

B 3 and

6 AGRICULTURE.

and Willows, promiscuously; but the Birch,
chiefly on the dryest part of the land.

I am, SIR,

Your most obedient humble servant,

*Petworth, in Suffex,
October 6th, 1790.*

WILLIAM JOHNSON.

Mr. MORE.

THESE are to certify whom it may
concern, that WILLIAM JOHNSON,
of Petworth, in the county of Suffex, did, in
the months of November and December
last (1789), set, or cause to be set, sixty-five
gallons of Acorns, in number about one
hundred thousand, nearly at equal distances,
between three and four feet apart; on
thirty-three acres, two roods, and thirty-
five perches, of very strong land, in the
parish of Chidingfold, in the county of
Surrey, parted only by a hedge from Hird-
ford in Suffex: and that he did, in the
months of January and February in this
present year (1790), plant, or cause to be
planted, on the same land, on each side of
the

AGRICULTURE. 7

the Acorns, upwards of one hundred and twenty-two thousand Forest-plants (not cuttings, but with roots complete), viz. upwards of forty thousand Ash, nearly the same number of Birch, upwards of twenty-five thousand Willows, and the remainder Alders; which land is drained by open ditches, and very completely fenced as follows:—Towards the West, against other lands of the said WILLIAM JOHNSON, by a ditch three feet deep and four feet wide at top, with a bank thereon three feet high planted with quicksets; which fence is in length sixty-eight perches and seventeen links of the chain: towards the North, against the woods of Mr. Baker and Mr. Hodges, called Fisher Lands, by a like ditch and live hedge, in length one hundred and eleven perches and nine links; towards the East, against Durfold Wood, by a like ditch and bank, with posts and rails at top, in length thirty-six perches; and towards the South, against lands in Hirdford parish, belonging to Earl Winterton, called Keyfes,

8 AGRICULTURE.

by a like ditch with live hedge, in length one hundred and one perches and seventeen links. And we do further certify, that the said plants are in a very thriving condition, not one in ten, as we believe, being dead; and that there are, as we compute, four hundred young Oaks on every acre of the said land which are sprung from the said Acorns, and are in a most thriving state; owing in a great measure, we conceive, to the frequent rains which fell in the months of April, May, June, and July last. Witness our hands, this eighteenth day of September, one thousand seven hundred and ninety.

JAS. DOUGLAS, Minister of Chidingfold.

JOHN DENYER, } Churchwardens of
JOHN BURDOCK, } Chidingfold.

M. REYNOLDS, Curate of North Chapel, in the county of Suffex, the adjoining parish to Chidingfold, who measured the land and fences, and had frequent opportunities of seeing the whole of the plantations.

The

The following Account and Certificates having been received, the GOLD MEDAL, being the Premium offered for planting Mixed Timber-trees, between the 1st of October 1786 and the 1st of May 1788, was this year adjudged to RICHARD SLATER MILNES, of Frystone, near Ferrybridge, Yorkshire, Esq.

SIR,

HAVING had the honour last year to obtain from the Society the Gold Medals for my plantations of Larches and Elms; I this year beg leave to offer my claim to the Medal offered for Mixed Planting, between the 1st of October 1786 and the 1st of May 1788.

During that period I planted ninety-four acres of land with different sorts of Timber-trees,

trees, according to the inclosed Certificate : the land is in general so extremely bad, and the soil so very thin, that the only crop worth cultivation was Saint-foin. The plantation has flourished so much, that I have been induced to enlarge my original plan, by adding those plantations for which I gained the Medals last year. (See Vol. VIII. p. 9.) The soil is so dry, that I have found the Larches succeeded best when planted immediately after the shedding of the leaf, the holes having been made in the course of the preceding summer. They were chiefly two-years-old plants, which had been transplanted ; there were some of four years old, but they do not answer so well : in some parts of the plantation, where they have thriven best, they are now from six to seven feet high. Most of the Scotch Firs were two-years-old plants that had been transplanted : I find these soon overtake those which, according to the usual practice, had been planted at three, four, or five years old.

The

AGRICULTURE. 11

The Birch thrive much better than the other deciduous trees: they were nearly two feet high when planted; many of them died at the tops the first year, but have since made very vigorous shoots. The Elms and Sycamores do not grow by any means so fast as the before-mentioned trees. The Larches grow so very luxuriantly, that in a few years I shall be forced to thin them considerably, to prevent their smothering the other trees.

The plantation is bounded on one side by a sunk fence fourteen feet wide, the wall of which is four feet and a half high, with a sod on the top a foot and a half thick; it is in the form of a crescent. With respect to the other fences, the land is of so little value, that I have in general followed the course of the hedges, and by that means have saved the great expence of new fencing. Considering the badness of the soil, quickwood hedges grow remarkably well; the observing of which was originally a principal

12 AGRICULTURE.

principal inducement to me to plant upon
so large a scale.

I am, SIR,

Your most obedient humble servant,

RICHARD SLATER MILNES.

Fryston,
October 30th, 1790.

Mr. MORE.

I DO hereby certify, that, between the
first of October 1786 and May 1788, I
planted, under the direction of Mr. Thomas
White, of Retford, for Richard Slater
Milnes, Esq. at Fryston, ninety-four acres
of land, with the following trees :

Larch	-	145,000
Scotch Firs	-	72,500
Ash	-	50,000
Sycamore	-	40,000
Elm	-	45,000
Oak	-	600
Spruce Firs	-	600
		<hr/>
		353,700
		Brought

AGRICULTURE. 13

	Brought over	353,700
Birch	-	30,000
Mountain Ash	-	10,000
Weymouth Pine	-	400
Horfe Chesnuts	-	200
		<hr/>
Total	-	394,300

Which are now in a thriving and flourishing condition.

JAMES MANN,

*Fryton,
October 30th, 1790.*

The

The GOLD MEDAL, being the Premium offered for cultivating the Upland or Red Willow, was adjudged to STEPHEN MARTEN, of Ringwood, Hants, Esq. from whom the following Letter and Certificate had been received.

S I R,

AMONGST the Premiums offered by the useful and valuable Society for encouraging planting and husbandry, that which recommended the Upland or Red Willow, attracted my notice ; and as I have lately planted a considerable number of them upon a peculiarly barren foil, I flatter myself that the result of my experiments and observations may not be unworthy their notice and regard.

The land which I have planted is a barren heath, very unfriendly to the hopes and expectations of the husbandman : upon the surface, to about the depth of three inches,

is

is a light black earth, beyond which nothing is to be found, to a great depth, but a dry white sand. Upon such a soil I have attempted to plant the Willow, which has succeeded beyond my most sanguine expectations.

During the month of March 1788, I planted upwards of four acres, by way of experiment; and as I was apprehensive that many would perish, through the sterility and dryness of the soil, I planted them very close, allowing to each plant one square yard: but, contrary to my fears, very few have failed; most of them appear strong, vigorous, and healthy, having since the time of planting made shoots to the length of five feet.

With regard to the method of preparing the land, it was trenched to the depth of eighteen or twenty inches, and then immediately planted. I have since, I think, improved upon this method, and have now
some

16 AGRICULTURE.

some of the same sort of land ready for planting: this has been ploughed, and suffered to lie two years in a rough state, that thus it may be affected by the atmosphere, mollified and ripened: this, when it comes to be trenched, will, I believe, answer better than the former method. The plantation is exceedingly well fenced and secured.

This, Sir, is the whole I have at present to communicate.

I am, SIR,

Your very humble servant,

STEPHEN MARTEN.

*Ringwood,
March 26th, 1790.*

Mr. MORE,

We the underwritten do certify the truth of the foregoing account, as witness our hands, this 26th of March 1790.

WM. GELLIBRAND.

R. F. MANSFIELD,

The

The following Paper on the utility of the Spanish Chestnut-tree was received from the Author, with Certificates of his having planted three acres, three roods, and fourteen poles, with Spanish Chestnut and Ash; but the conditions of the Premium offered, being that four acres should be planted, Mr. MAJENDIE could not be admitted a candidate for the Premium. Yet the useful and instructive information contained in the Letter being apparent, the thanks of the Society were given to the Writer for the communication, and he was requested to permit the Paper to be printed in the Society's Transactions.

S I R,

IN the course of last winter I planted a field, in the parish of Castle Hedingham, containing somewhat less than four acres, with seven thousand two hundred
C and

18 AGRICULTURE.

and four Spanish Chesnut, and one thousand nine hundred and eighty-seven Ash trees. It was my original intention to have composed this plantation totally of Chesnut; but not having a sufficient number of that plant, I filled up the remaining ground with Ash.

Concerning the latter plant, I shall not trouble you with any mention, because the unusual and very extensive scale on which the culture of the Ash has been adopted by Mr. David Day of Rochester, see Vol. I. page 9, who has so deservedly been the object of the Society's honours, must render any thing I may say on that subject superfluous.

The culture of the Spanish Chesnut-tree has, for some years past, been the object of my particular attention; and though, as yet, the time has been too short to allow me to speak from decided experience, yet such
has

AGRICULTURE. 19

has been my success in cultivating this tree, as to satisfy me of its general utility.

The Oak, the pride and glory of the forest, must, from its many excellent qualities, ever maintain the pre-eminence it so justly merits: the Chestnut, however, can boast of some qualities, even of the higher order, hardly inferior to the Oak; and in the more subordinate line of utility, it may be said even to surpass it; I mean, in its various uses for Underwood.

It is much to be lamented, that, in the formation of Underwoods, so little attention seems to have been had to the sort of tree requisite for such purposes: instead of the Spanish Chestnut or Ash, it is too common to see large tracts of wood land whose Underwoods consist chiefly of Hazel, Hornbeam, and others of little use but for fuel; whereas the first-mentioned trees, besides being equally serviceable for that purpose with the latter, are greatly superior to them,

as well as to most others in essential uses : so that, at the same time that the refuse of their growths might be consigned to the fire, the better parts might be destined to those purposes for which they are more particularly suited ; and by such management a double advantage would arise.

Amidst a variety of subordinate uses to which, from my own observation, the Spanish Chestnut seems adapted, are those of poles for hops, and stakes for various purposes of husbandry. I have formed several plantations of this tree, with the view of treating it as Underwood. The tree itself possesses a peculiar faculty of branching, provincially called *stubbing*, from the roots after being cut down, and this in a much greater degree than any of the useful forest-trees ; so strong indeed is its propensity that way, that it is with some difficulty and attention that timber-trees of the Chestnut are restrained from this redundancy of growth, which it is apprehended,
by

by preventing part of the nutrition from ascending the stem, is apt to hinder their progress: but this quality, however inconvenient it may be in its effects to trees intended for the purposes of timber, is of eminent advantage to those designed for Underwood; since, when the tree, after standing two or perhaps three years, to enable it to form a sufficient root, is cut down to a proper distance from the ground, it throws up in the following summer a profusion of strait shoots, which in due time become poles, such as for strength and durability exceed all others whatsoever, even those from the Ash, which is generally considered as the best tree for this purpose.

Chestnut Poles, it must be confessed, are slower in growth than those from the Ash; but, on account of their greater durability, they are more profitable to the possessor; and I have been credibly informed, that in some parts of Kent where this useful tree

22 AGRICULTURE.

has been adapted to this purpose, its superiority to the Ash is uncontroverted.

For the purposes of stakes for hedges, or other uses of that nature, its superiority seems equally established. I some time since formed a hedge, the stakes of which are wholly from Chestnut-trees of my own planting: they are of such a degree of hardness, as to satisfy me, that the character given of its use for such purposes is by no means unfounded *.

The plantations of this tree which I have formed, excepting that above mentioned, are mostly cut down for Underwood: the luxuriance and quantity of shoots from the stumps afford me great satisfaction, and will, without

* Poles of this tree for hops, vines, &c. will last longer than of any other, and stakes of the Underwood will last nearly twice as long as those of any other sort.

Vide Hunter's *Evelyn's Silva*, ed. 2. Vol. I. p. 154.

without doubt, answer my highest expectation.

I transmit to you herewith the stem of a Spanish Chestnut-tree, cut down, this day, to a distance within two inches from the ground: this tree was planted by me in December 1785, and was, when planted, of the size of the other tree which also accompanies it. By this specimen the Society will be able to judge how well the tree agrees with my foil *.

As it has been with so much earnestness recommended by writers of eminence, as well as by the truly excellent and laudable Society to which you, Sir, are attached, to revive the lost culture of the Spanish Chestnut; I can but feel an ardent wish, from a conviction of its real use, to second such views, by doing all that is in my power to attract the attention of persons of more ex-

C 4 perience

* These specimens are reserved in the Society's repository.

24 AGRICULTURE.

perience and penetration than myself to the culture of a plant, which in this part of the country might almost be deemed an exotic. I have the honour to remain,

S I R,

Your most obedient humble servant,

LEWIS MAJENDIE,

*Hedingham Castle, Essex,
October 31st, 1790.*

Mr. MORE.

The

The following Account of the comparative advantage of the Drill and Broad-cast Husbandry, and the Certificate annexed, having been duly received, the GOLD MEDAL, being the Premium offered for that Article, was adjudged to the Candidate Mr. THOMAS ROGERSON, of Narford, near Swaffham, Norfolk.

S I R,

HAVING seen, in the Eighth Volume of the Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, a premium offered for drilling not less than four hundred acres ; I take the liberty of laying before the Society the following account of seven hundred and nine acres and a half, drilled in 1790, including wheat drilled in 1789.

In the middle of October 1789, I began to drill with the drill-roller, at four inches
and

26 AGRICULTURE.

and a half afunder, and fix pecks per acre of wheat, a field containing forty-two acres of two years layer, ploughed one earth or furrow after being dunged in July; the soil, light and chalky. The appearance of the crop in the spring was not promising, being a very thin plant; but was much improved by hand-hoeing, which commenced the 30th of April, at fix shilling per acre, and turned out at harvest far better than I could have expected from broad-cast in the common method.

It may not be improper to give some account of this machine. It consists of fourteen cast iron wheels, with sharp edges, weighing half a hundred weight each, which runs on a spindle or axle that is fixed in a frame with double shafts; these wheels are four inches and a half afunder at the edges, and, by indenting the land to receive the seed (which is sown broad-cast, and harrowed in with short teeth harrows, the same way it is drilled), are so formed as to bring

bring the space of land between each drill to a sharp edge ; by which means the seed is all conducted into the incisions made by the wheels, about two inches and a half in depth. It requires four horses to draw it, and is hard work for them to prepare from six to eight acres a day, with a man and boy. I think this mode of drilling answers every purpose of dibbling, and in my opinion is preferable, as the seed is all deposited at an equal depth and distance, and more equally distributed by a good seedfman than by a variety of children, where scarcely two drop alike.

Yet I by no means think the roller equal to Mr. Cooke's machine, which enables me to hoe at a quarter of the expence. One of these I received from Mr. Cooke the 1st of November 1789; and on the 11th of the same month I began to drill part of a field with it, viz. twenty-one acres with wheat, at nine inches, and six pecks per acre, worked only with one horse, and drilled
about

28 AGRICULTURE.

about ten acres a day; the soil very light, and near the chalk; summer-tilled after peas, and folded with sheep: the appearance in the spring very promising, and astonishingly improved by hand-hoeing, which was performed by women, the middle of April, at eighteen pence per acre. The crop at harvest was very good, far exceeding my expectations, as will appear from comparison with the remainder of the field with, viz. twenty-seven acres of a similar soil, and treated in the same manner in every respect, except its being sown broad-cast with two bushels and a half of wheat per acre. To ascertain the difference of these two crops, by a small quantity left at harvest in the finishing each stack, I threshed an equal number of sheaves of each, viz. two hundred and twenty-four: produce, as follows: From the drilled wheat, I had twenty-eight bushels; from the broad-cast, nineteen bushels three pecks and a half; and the quality of this grain much inferior to the drilled. But I shall be able, at the conclusion of threshing

AGRICULTURE. 29

threshing, to give an exact account of the whole produce of each, with what was also cultivated by the drill-roller, as they are stacked separate; and I shall be careful in threshing them so likewise.

On the 18th of November 1789, I began to drill, with Cooke's machine, part of a field, fifty-six acres, with wheat, six pecks per acre, at nine inches, on a one-year's layer; ploughed one earth about a week before drilling. Nearly twenty acres of the above was dunged early in the spring of 1789, and is tolerable mixed soil, which I hoed once in March by hand, at eighteen pence per acre, and again in May with the horse-hoes, which considerably improved the crop each time, and made it by far the best crop of wheat ever remembered to grow on that land: the remaining thirty-six acres had no manure, and consist of a very sandy soil, which I hoed by hand, once in March, at eighteen pence per acre, and proved as good
a crop

30 AGRICULTURE.

a crop as I generally used to grow on better land manured and sown broad-cast.

On the 5th of February 1790, I drilled with the roller the last-mentioned field with rye, viz. twenty-four acres, with six pecks per acre, not manured, and in every respect the same soil as the last-mentioned thirty-six acres, drilled with wheat; I did not hoe it. The produce of this wheat and rye was as nearly alike as possible, viz. about four combs per acre: the rye sold for thirteen shillings, the wheat for twenty-three shillings per comb; so that it made a difference of forty shillings per acre.

In the middle of February 1790, drilled with the roller an inclosure of six year's laying, containing twenty-six acres, with oats, three bushels per acre, a very ordinary black sandy soil, ploughed one earth: the flag was very tough: by means of the roller, the seed was deposited at a proper depth, and proved a very good crop.

The

AGRICULTURE. 31

The latter end of January 1790, drilled ten acres with grey peas, three bushels per acre, with Cooke's machine, at nine inches, on barley stubble, ploughed one earth, chalky soil: some frosty mornings early in the spring apparently injured them much; but on hoeing them by hand, in May, they perfectly recovered, and produced better than four waggon-loads per acre.

In the last week of February, and beginning of March, I drilled a field containing eighty acres with white peas, one half with Cooke's machine, the other half with the roller, each three bushels per acre, on a two-years layer, ploughed one earth, very light soil: the machine far surpassed the roller all summer. These were not hoed.

The middle of March drilled a field of one hundred and thirty acres with oats, on a two-years layer, with the roller, three bushels per acre, very black sandy soil. Just at their appearance out of the ground, we
had

32 AGRICULTURE.

had terrible high winds: the land blown much; and had they been sown in the common mode, must have been entirely destroyed; but they recovered, so as to be a far better crop than numbers who daily saw them ever expected they would be.

On the 12th of March, began to drill barley on the turnep land, with Cooke's machine, ploughed one earth, two bushels one peck per acre, at nine inches, light soil, on a field of sixty-eight acres, which I hoed the latter end of May by hand, performed by women at eighteen pence per acre.

On the 7th of April, drilled fourteen acres of barley, with Cooke's machine, two bushels one peck per acre, at nine inches, on wheat stubble, ploughed two earths, not hoed. In this field I found a sensible difference in the appearance of the crop: the straw short and faint, the ear small, and grain inferior to the hoed barley, although the land was better in quality.

The

AGRICULTURE. 33

The last week in April, drilled thirty acres with grey peas, two bushels and a half per acre, at nine inches, on a two-years layer, ploughed one earth, on chalky foil; hoed them the latter end of May, by hand, at eighteen pence per acre: they grew rapidly, and were very well hung.

I continued drilling barley on turnep land (viz. land from which a turnep crop had then been taken), with Cooke's machine, from the latter end of April to the 14th of May, one hundred and thirty-six acres and a half, two bushels one peck per acre, at nine inches, seventy-five acres of which I had hoed by women as before; the foil very light.

N.B. The days now being long, I drilled from thirteen to fifteen acres per day, by taking fresh horses and men. I frequently sowed a few acres broad-cast between the drilling, but was all inferior thereto.

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34 AGRICULTURE.

On the 14th of May, I began drilling, with Cooke's machine, part of a field, viz. forty-two acres, of two years layer, ploughed one earth, light sandy soil, with two bushels one peck per acre of barley, at nine inches: the remainder of the field, about thirty acres, was ploughed one earth, and sown broad-cast a fortnight before, with three bushels and a half of barley per acre; but from hoeing, the part drilled the beginning of June, proved a better crop than the broad-cast.

From the 16th to the 20th of May I was drilling two inclosures, containing thirty acres of two-years layer, with the roller, a black sandy soil, with three bushels of oats per acre: the season for oat-sowing being too far advanced, I had still a better crop, by means of the roller, than otherwise to be expected.

Having

Having only one of Cooke's machines, I was deprived of the use of the horse-hoe till very late; when the season proving wet, prevented my making much use of it.

I have lately purchased another machine of Mr. Cooke, with several more for different gentlemen, who, from frequently viewing my crops during the summer, were convinced of the utility of drilling, and shall endeavour as much as possible to scarify and hoe the whole of my drilled corn next season; as I am thoroughly convinced drilling without hoeing is of little or no use.

I have drilled, since Michaelmas 1790, two hundred and two acres of wheat, in various ways, which will afford me an opportunity of making several experiments; an account of which, together with the variety of other grain I intend drilling in the

36 AGRICULTURE.

spring, I intend to have the pleasure of transmitting to the Society next year. In the mean time I remain,

SIR,

Your most obedient humble servant,

THOMAS ROGERSON.

*Narford, near Swaffham, Norfolk,
January 29, 1791.*

Mr. MORE.

THIS is to certify, that we have frequently viewed the before-mentioned crops of corn, &c. growing on Mr. Rogerfon's farm, and believe them to be fairly stated.

BRIGG FOUNTAINE, of Narford.

WILLIAM TAYLOR, } of Swaffham,
 } Curate of Narford.

W. MASON, Necton, near Swaffham.

The

The following Letter from the Reverend
WILLIAM TAYLOR was received, in
answer to one written by order of the
Committee of Agriculture.

SIR,

I REQUEST the favour of you to inform the Committee of Agriculture, that I signed the Certificate for Mr. Rogerfon's claim for Drill-Husbandry; and that, from my own personal observations, and my frequent inquiries of Mr. Rogerfon, concerning the Drill-Husbandry, in the years 1789 and 1790, I believe every article in the claim to be strictly true.

I am, SIR,

Your very humble servant,

WILLIAM TAYLOR.

Curate of Narford.

Swaffham,
Feb. 10, 1791.

Mr. MORE.

The Thanks of the Society were given to SAMUEL DUNN, Esq. for the following communication: and he was requested to oblige the Society, at some future period, with an account of the produce of the Wheat mentioned to be growing on the land.

S I R,

I FEEL myself so much indebted to the Society for the information I have obtained in a variety of instances, and more particularly from the circumstance I am about to relate, in which considerable profit has attended my experiments in Agriculture, that I think it a duty I owe to the Society at large, to acquaint them with my success, whereby an ancient and habitual prejudice has been overcome.

The knowledge we daily gain from the labours of scientific and ingenious men, will, in progress of time, bring our island into
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the greatest repute ; and the readiness with which the Gentleman, the Farmer, and the Gardener, attempt to bring to perfection new discoveries, does credit to our country, and enriches its inhabitants.

I now take the liberty of stating to the Society an experiment in Agriculture, where the fixed notion of a fallow being absolutely necessary to destroy quick or couch grass, and make the land prolific for the next crop, is at least very much weakened, if not totally destroyed.

A piece of land near the River Trent, in Lincolnshire, measuring one acre and a half, was, two years ago, in the occupation of a tenant who managed it so ill, that I found it in very poor condition, and overrun with quick grass.

In that state I took it into my own hands at Lady-day: through the bad conduct of my agent, it was sown with barley, and

40 A G R I C U L T U R E .

laid down with clover and other seeds : the crop was indifferent, and the small seeds were choaked and lost.

Every person I consulted, advised a summer fallow, assuring me no other method would do, and that it should be sown with linseed the following spring, and then laid down for grass.

The knowledge I had gained in attending the Agriculture Committees, and reading the Society's annual publications, induced me to think otherwise; and had furnished an idea, that a good crop of Potatoes might be got, and the land enriched by the manure necessary for that crop, as well as by the manner of setting them; so that the quick grass and weeds might be in great measure, if not totally, destroyed by the hoeing, &c.

I communicated my thoughts to the Rev. James Cooke, and to you, Sir, who were of
the

the same opinion; and I accordingly gave directions for the land to be prepared, and the Potatoes set in the first week in May 1790.

I here again must acknowledge the value I ought to set upon the honour of being a Member of this Society; for the information which the Society had obtained relative to the cur'd Potatoe, and for which they so properly threw out their premium, and gave their money, I availed myself of, and ordered Potatoes to be bought, of a different sort from any then in our country, and from land not similar to mine in quality, and purchased that sort called the Scotch Kidney.

The Potatoes came up in a pleasing manner, grew most luxuriantly, and I had not one curled amongst them: in the month of July they were thought so valuable, that eighteen pounds was offered for them on the ground.

They

They stood till October, when they were taken up, and a large pye made of them; which is laying them up in a heap, and covering them with straw and a spit of earth. In December last they were sold, and one hundred and twenty sacks were delivered to the buyers, at four shillings per sack, which amounts to twenty-four pounds; besides a sufficient quantity saved for setting two acres of land in the spring; and our country family having sufficient for their use, several bushels given away, and some sent to town.

In the same month the land was once ploughed, and without any fresh manure sown with wheat, which is now on the ground in a promising state.

The Society will, from this experiment, find that their labours are daily becoming more and more useful to mankind: and whilst they are receiving information by practical knowledge, and the communications of their Candidates, they are encouraging

AGRICULTURE. 43

raging improvements for the good of the kingdom in general, and benefiting individuals, by removing ancient prejudices, and fixing a system of practice unknown to former times.

I am, with great regard,
Your and the Society's devoted
and obliged humble servant,
SAMUEL DUNN.

*Adelphi,
January 10th, 1791.*

Mr. MORE.

S I R,

I RECEIVED the very great honour of the thanks of the Society of Arts, Manufactures, and Commerce, communicated to me by your very polite and friendly letter of the 27th instant, and acknowledge myself infinitely obliged to them for their kind attention. It will afford me great satisfaction, to have it in my power to send them any information that may be of use to the public at large, and forward the views of the Society.

The

44 AGRICULTURE.

The following are the apparent expences attending the growth of the Potatoes, mentioned in my letter to the Society, as extracted by me from my agent's accounts.

I am, with great esteem,

SIR,

Your obliged and very humble servant,

SAMUEL DUNN.

Adelphi,

January 29th, 1791.

Mr. MORE.

	£.	s.	d.
For help in preparing the land	0	4	0
— manure bought	1	1	0
— 12 facks of potatoes, at 7s.			
per fack	4	4	0
— cutting potatoes	0	8	0
— leading manure, and setting			
potatoes	0	13	6
— weeding potatoes	0	4	0
— getting them up, and pyeing			
them	1	18	8
	<hr/>		
	8	13	2
To which add the rent of the land,			
half year, at 20s. per acre	0	15	0
	<hr/>		
	£	9	8 2
	The		

The GOLD MEDAL, or Twenty Guineas, being the Premium offered for feeding Cattle and Sheep with Potatoes, was adjudged to Mr. JAMES BUCKNELL, of Knowlstone, near Tiverton, Devon, from whom the following Paper and Certificate were received.

S I R,

I HAVE cultivated Potatoes for the purpose of feeding Cattle and Sheep, these several years past; and still continue the practice, having planted a greater quantity this year than in any preceding year.

I first made the experiment in the year 1784, and planted that year, for the purpose aforesaid, about one acre only, exclusive of what I planted for the use of my family. I have been continually increasing the quantity in every succeeding year since; and last year, 1789, I cultivated not less than thirteen
acres

46 AGRICULTURE.

acres one rood and nine perches, statute measure ; the produce of which was solely applied to the purpose of feeding cattle and sheep : this present year I have a greater quantity.

The success attending this practice hath far exceeded what I at first expected. The cattle, when a little used to Potatoes, grow exceeding fond of them, and will eat them in preference to any thing else I can give them ; but I find it necessary to give them sometimes oat-straw and hay : the former is particularly useful, to prevent that laxative state of body which the cattle would otherwise be subject to, from the rich and nourishing quality of the Potatoes, if confined wholly to that sort of food.

Cattle thus fed I generally dispose of to the butcher, the beef of which is exceeding well tasted : some, indeed, I have sold, after having been kept in the manner I have described, to other graziers, who intended to
make

make them fatter ; but have not been able to make them pay the expence of keeping, after having been thus kept on Potatoes, though removed by them to some of the richest pastures in Somerset or Devon, as they have afterwards told me. This must be solely owing to their being kept on Potatoes ; for the best land I have on the farms I occupy, is but of a middling quality.

The number of cattle I feed yearly is about fifty, which I make fit for the butcher in the manner I have mentioned ; but I not only give Potatoes to such cattle as are immediately intended for the butcher, but some also to my plough oxen, milch cows, calves, and sheep. I give the Potatoes to the cattle and sheep, not washed, but with some earth about them, and find, from experience, that this is much better than when clean washed ; but if too much earth remains about them when taken from the heaps, I rub or shake them in an iron sieve.

In

48 AGRICULTURE.

In cultivating Potatoes, I have tried various methods; but that I have chiefly used lately, is the following: Having made the land to a good fallow by sufficient ploughing, harrowing, &c. and marked out the breadth of the beds, I plough two furrows between each bed, and a sufficient number of labourers push the earth from the places where the beds are intended to be, with instruments which I have had made for that purpose, on the furrows, being the places intended for alleys; then spreading a sufficient quantity of dung, set the Potatoes, being first cut in pieces, thereon; the labourers, with shovels, cover them with the earth, making the ground into beds. After remaining thus about a month, and the Potatoes beginning to grow, I have two furrows ploughed in each alley again, deeper than the former, the earth of which is again spread over the Potatoes; which tends greatly to prevent or check the growth of weeds, and promote the growth and increase of the crop.

The

The whole expence of tilling an acre of Potatoes by this method, from the first breaking up the ground, including dung for manure, Potatoes for feed, and labour, amounts to about five guineas: the usual produce thereof, upon an average, is one hundred and sixty bags, each bag containing twelve pecks, Winchester measure: the usual quantity of feed I allow to an acre, is ten bags of the same measure.

I get the Potatoes dug up in the latter end of October and in November, at a penny per bag, and then carry them into houses, made fit to preserve them from being injured by frost, where they remain for use.

I have this year tried a method different from any of my former; but having not yet got them dug up, and consequently not ascertained the success of it, think it unreasonable to add any remarks thereon at present: but should any thing I have written be

E thought

50 AGRICULTURE.

thought worthy the attention of so respectable a Society, instituted for such laudable purposes, I shall be ready at all times gladly to communicate any further information in the power of

Your most humble servant,

JAMES BUCKNELL.

*Knowstone, near Tiverton, Devon,
October 30th, 1790.*

Mr. MORE.

THIS is to certify, that I measured for Mr. James Bucknell, of Knowstone, a quantity of land, containing thirteen acres, one rood, and nine perches, statute measure, in all which land Potatoes were cultivated in the year 1789; and being an inhabitant of the same parish, have the greatest reason to believe they were solely applied to the purpose of feeding cattle and sheep; as witness my hand,

GEORGE TARR.

WE

AGRICULTURE. 51

WE the undersigned, having read Mr. Bucknell's account of his cultivating of Potatoes, for the purpose of feeding cattle and sheep, being persons dwelling near him, do hereby certify, that we believe the same to be strictly true; as witness our hands,

JOHN PALFREMAN, (Farmer).

WM. CARTER, Vicar of West Anstey.

S I R,

IN compliance with your request, desiring to be informed whether I signed Mr. James Bucknell's Certificate, stating, that he had planted thirteen acres one rood and nine perches of land with Potatoes, for the sole purpose of feeding cattle and sheep. I can assure you that I did sign it, having been an eye-witness to almost every article contained in his memorial.

I am, SIR,

Your very humble servant,

WILLIAM CARTER.

*West Anstey,
Nov. 29th, 1790.*

Mr. MORE.

The following Paper, with others, was sent in claim of the Premium offered for discovering the nature and cause of the Disease called the CURLED POTATOE, and point out an effectual cure; but as it did not appear to be entirely satisfactory, the Society could not adjudge the Premium to the Author: yet being found much superior to the others, and in consideration of the useful information contained therein, and the confirmation of the doctrine laid down by him last year, see Vol. VIII. page 18, a bounty of TEN GUINEAS was voted to the Author, Mr. THOMAS HOLLINS, of Berriew, in Montgomeryshire.

I THOUGHT it proper to lay before the Honourable Society my first proceedings in the cultivation of Potatoes.

I have

I have been a planter of that useful root upwards of twenty years, when the Winter Red was, in general, the kind planted, and before any sign of that disease called the Curl appeared. Soon after, the white kind, called here the Golden Dabb, was planted; these were a very palatable kind, but now most subject to curl; which kind I have planted these ten years, and never changed my seed. —A little time after, a new method of planting took place, such as is in use at present, ridging the ground, and manuring well with earthing, which caused this new kind to prove very productive; and producing crops of a much larger kind than those first planted.

This practice was soon communicated through this country; it was then the Curl first made its appearance here, about seventeen years ago, which in very few years after proved highly injurious to this country in general.

54 AGRICULTURE.

I was very desirous, by any means, to find out the remedy, which caused me to try every experiment I could think of; but all to no purpose, till the year 1785, which was a very dry summer: I had then planted, in a field, an acre; I happened to cover them, when set, so that there was no mould left for the second earthing.

About the end of July, I saw several persons trying these Potatoes, from kind plants, with bells, or apples, come to perfection; but no sign of any young potatoes, at the root. It was a general report that there would be no crop that year; accordingly, I went to try my own: some I found without any, and some with young potatoes, about the size of walnuts; but, as generally is the case, soon after, the season altered, and became moist and rainy for a considerable time, which caused every cultivator to earth and tend his crops, in hopes of success; but, as I mentioned before, I had not the convenience of earthing.

Yet,

Yet, when digging time came, there was a very plentiful crop of very large potatoes produced; but my plants ripened much sooner, because they had not fresh nourishment by earthing, and were not half as large as most of my neighbours.

In 1786, when the Potatoes came through the ground, it was reported in the country, that the Potatoes were curled in general: I fold that year about one hundred and twenty bushels; but I found, to my satisfaction, that my own, and all that I had fold, were as kind as ever. It was then I began to study how mine should escape the disease, it being so general through the country; I recollected I could not earth mine the preceding year, and that they were not grown to the size of others: I built upon that foundation, as that was the cause. It was soon reported that my Potatoes proved well, by which means I was applied to, the following season, from a considerable distance, for seed; and being very attentive to the same form

56 AGRICULTURE.

of cultivation, found myself in the same situation as the year before.

Thus, to satisfy my curiosity, I planted two rows: one I managed as I observed in my first accounts, see Vol. VIII, p. 22; and one row, as per account, Vol VIII, p. 25.

I preserved seed from both, keeping them separate until the ensuing season; when, to my great joy and satisfaction, found the plants from the former half-curved; the latter, free as before: then I was fully satisfied in my opinion.

I have since raised yearly from one hundred to one hundred and forty bushels, which I have sold from six-pence to one shilling a bushel dearer than my neighbours: these have always proved well. Some of the names of those persons, I sent you in my first certificate. Many persons took upon them to say that I pickled them, whilst others said that I plucked up the curls the year before;

before; but their groundless reports gave me no concern; neither did any one know my method, till I sent in my account to the Society in November last. But in the mean while, I observed how my neighbours managed theirs, which was always a proof that served me for experiment, and which supported my opinion.

I had then set some large Potatoes whole, one or two of which produced very kind plants, and curled, which amazed me much. I got the Potatoe tenderly up, and found two curled plants from the two sets, next the butt-end, and all the rest kind: this caused me to try my best experiment on the occasion; I observed the infection was only in the largest; I imagined the sap or vegetative power decreased from the butt-end, as it grew larger, and consequently must increase towards the crown point. I had then a plat, part of which I dug about the middle of September, another part in October; found they had increased in size: the rest I dug
about

58 AGRICULTURE.

about the end of October, which were much larger than any of the two former: part of the largest of each digging, I kept separate till the year following, which I planted whole, taking especial care, putting it down on paper, where every sort was set. When they came through the ground, I found the first dug all free from curl, the second produced plants both kind and curled, the latter were entirely curled.

Thus I found, if the season permitted, I could either cause them to curl, or prevent it; accordingly, I sent an advertisement to Mr. Wood's, Printer of the Shrewsbury Paper, that a person had found out the cause and cure of the disease: I received no answer nor encouragement, till a friend sent to me a letter, wherein he signified the Society at the Adelphi.

I have sent, in my first account, in the year 1789, my whole discovery of the disease, from which I shall never vary, but
shall

I shall add some few experiments I omitted in that first account.

Since I received the reward from the Society, in May last, some of the leading gentlemen in my neighbourhood have desired anxiously to know my method; to whom I delivered it fully, and gained their approbation: they have since shewed it to several persons, some of whom have told me that I have saved them the trouble of coming to me for seed any more.

I shall with the greatest pleasure lay down several experiments, which, I hope, will be to the satisfaction of the Society.

First, I will plant an acre with potatoes, especially if I may choose my situation, which shall prove kindly plants: I will manage as I shall think proper even every other row; the one half shall ripen, and die, three weeks before the other, whilst the rest shall be in a flourishing state: I will
dig

60 AGRICULTURE.

dig them up when I think proper; and the following year I will set some of both seeds, in the same manner; and the one half shall prove kind plants, and the rest greatly infected, even every other row, which shall be testified by credible witnesses.

Secondly, I think it proper to lay before you the cause of an infected crop proving more infected.

An infected crop is, perhaps, when one fourth are kind plants, and the rest all curled. The prudent cultivator endeavours to earth and nourish his poor crop, in order to make it as productive as possible: by that method the few kind plants being so far distant from each other, grow rank, and will produce a far larger sort, than if they had been a full crop, as I have previously observed, p. 25, Vol. VIII. I have observed, the cultivator carefully picks the largest for his seed, because they proceeded not from any curled sort: it is more than ten to one
but

but they will be mostly curled, when they next appear.

Thirdly, To prevent the Curl, be careful not to earth nor meddle with them, except weeding : it had been better to have set the curled sort, which, as I have experienced, have proved kind.

Fourthly, Why some Curls appear in a crop that has been carefully managed.

Perhaps the soil might be richer in different parts of the field, or the manure laid on more plentifully : those Potatoes will be larger, and consequently the sap or vegetative power will be decreased ; then, when a few of those are cut amongst the seed, some curled plants will be produced. To avoid this, set none which exceed the average size, of any kind.

Fifthly, There is no foundation for saying, that the Curl in Potatoes arises from
their

62 AGRICULTURE.

their being too long planted in the same ground: the method now used, is not to plant them more than one year in the same field, and that commonly on fallow; this I am certain is a sufficient change. I have now by me near two hundred bushels, which I will wholly forfeit, if they do not produce a kind crop, with scarcely a curl among them, though planted in different sorts of land.

Sixthly, Though the shoots should be cut; set the shoots and the sets, and I will affirm, if the set has its sap, both will prove kind; but if the set is corrupted, both will be curled.

“ A good tree cannot bring forth evil
“ fruit; neither can a corrupt tree bring
“ forth good fruit.”

Seventhly, I have experienced that the
Old Winter Red, the long Americans, Pink
Eyes, Pretty Bettys, the Early Dwarfs, the
Black

AGRICULTURE. 63

Black fort, the Golden Dabb, and several other forts, have all curled ; but further is needless to mention. Should I encourage the importation of fresh seed, I should not deem myself worthy of the Society's favour, nor capable of discovering the disease.

Eighthly, To the curious, or those who have a mind to prove my experiment :

As I have endeavoured to shew the cause and cure of the disease, I think it proper to lay it down, with full directions. How to obtain a curly crop of Potatoes. Set, the beginning of June, not very thick in the row ; manure well ; earth them the usual time, do it repeatedly once in fourteen days, two or three times ; let nothing browse them till the end of October ; and when dug, pick the largest, and preserve for seed ; and if the season permits (as I have observed in Vol. VIII, page 21), I dare venture to promise a plentiful crop of curled Potatoes.

Ninthly,

64 AGRICULTURE.

Ninthly, When a dry summer, the ground well manured, with earthing co-operating, the cultivator must be very careful; for the above-mentioned observations are the real and only cause of bringing on the disease: but rich soil, having a southern aspect, even in a seasonable year, is equal to a dry summer in other situations.

SIR,

I HAVE deferred answering your favour of the 28th of December last, until I had made a proper inquiry into the crops produced by the Potatoes bought of Mr. Hollins, last year, for seed. I examined about twenty different persons, who bought their seed-potatoes of him; whether the crop was totally free from the curl; and their answers were unanimously in the affirmative. It was further asserted by several of them, that, having set the Potatoes in fallow ground, the crop was entirely free from curl; whilst others who had set different

AGRICULTURE. 65

ferent sorts of Potatoes in the same piece of ground, had them more or less curled.

With respect to the experiments, I have nothing to add. But I really believe that the circumstances related in his Paper sent to the Society this year, are strictly true: that he could sell his Potatoes from six-pence to twelve-pence a bushel more than his neighbours, is a well-known fact.

The man who assisted Mr. Hollins to dig up his Potatoes, asserted that they were totally free from Curl.

I am, SIR,

Your very humble servant,

ROBERT WILLIAMS.

*Berriew,
Jan. 19th, 1791.*

F

I DO

66 AGRICULTURE.

I DO hereby certify, that I have, for three years last past, planted several bushels of Mr. Hollins's Potatoes, and at the same time, in the same ground, and in the same manner, as many of my own Potatoes; that most of my Potatoes were curled, and none of his.

PRICE JONES, one of his Majesty's
Justices of the Peace for the County
of Montgomery.

Jan. 22d, 1791.

The

The following Paper was received by the Society, in claim of the Premium offered, in the year 1789, for an Account of the comparative advantage of the Drill and Broad-cast method in the Culture of Turneps; but the Candidate not appearing to have fully conformed to the terms of the Advertisement, the GOLD MEDAL could not be adjudged to him: but in consideration of the information contained in the Paper, the SILVER MEDAL was voted him, see Vol. VII. page 229, and the Paper directed to be printed in the Society's Transactions.

ON the 6th of July 1789, I drilled, with the Rev. Mr. Cooke's machine, four acres of Turneps, and on the same day, in the same field, sowed two acres broad-cast, manured from the same heap, and in every respect treated the same; but did not venture to drill more, until I was enabled to judge. I observed very attentively the pro-

68 AGRICULTURE.

grefs of the four acres drilled; and I have the fatisfaction to fay, that a very considerable difference appeared in favour of the drilled, from their firft coming up; and being fully convinced of their fuperiority, I broad-cast no more, but drilled the remainder of my land for Turneps, thirteen acres.

The Turneps drilled on the 6th of July were ready for hoeing five or fix days before thofe fown broad-cast on the fame day; and there was the like difference in the thirteen acres, and fome broad-cast fown in the intermediate time.

Befides, Turneps drilled are, I conceive, lefs liable to be injured by froft, and lefs difficult to hoe than when fown broad-cast; and I found little more than three fifths of the feed ufually fown broad-cast, fufficient for the ground that was drilled.

No

AGRICULTURE. 69

No person the least acquainted with agriculture will be surprised that seed deposited from one and a half to three inches deep, should vegetate sooner, and grow faster, than seed sown on the surface, and in general not buried more than from one quarter to one inch deep, at that season of the year when moisture is an object, and consequently less liable to be destroyed by the fly; which I found to be the case, as not any of those drilled were materially hurt, and a part of the broad-cast were.

Some days after, I was informed of a Medal being offered to determine the comparative advantages of the drill or broad-cast method, in the cultivation of Turneps. I selected two perches of those drilled on the 6th of July, and those sown broad-cast on the same day, as nearly equal in appearance as I could, which I carefully weighed, and found as follows:

70 AGRICULTURE.

On the two perches drilled,	494 lb.
On the two perches broad-cast,	446
Difference	<u>48 lb.</u>

	Ton.	Cwt.	qr.	lb.
Or per acre, drilled,	17	12	3	12
broad-cast	15	18	2	8
Difference per acre	<u>1</u>	<u>14</u>	<u>1</u>	<u>4</u>

Acres drilled, 17 } between the 5th and
 Acres broad-cast, 15 } 31st July, 1789.

32

And I beg leave to state, in corroboration of what I have above asserted, respecting the difference in the weight of Turneps drilled, and those sown broad-cast, that Hutcheson Mure, Esq. of Great Saxham, in Suffolk, found a difference of four tons per acre in favour of the drill method. See Young's Annals, Vol. IX. page 432, 433.

The

AGRICULTURE. 71

The reward offered by the Society for the cultivation of Turneps, having afforded me an opportunity of communicating my sentiments and experiment on that subject, it may not, perhaps, be displeasing to them, or improper in me, to take the liberty of mentioning that I drilled, with the same machine, one hundred acres of wheat, the last season, which has been horse-hoed some time by that most excellent instrument of Mr. Cooke's, annexed to it for that purpose, which I last year found much preferable to hand-hoeing, by penetrating deeper in the ground, notwithstanding the greatest part of my land is very stony.

I also drill my barley, oats, fainfoin, and clover; and in future I intend to drill all my Turneps with the same machine. I have practised drilling four years (the two first with Mr. Horn's machine, of Dover); and am so well satisfied with my crops, that I intend to continue; and have the pleasure to say, that several of my neighbours

72 AGRICULTURE.

approve the system, and practise it with the same machine.

I am, SIR,

Your humble servant,

WILLIAM DANN.

*Gillingham,
March 16th, 1790.*

Mr. MORE.

MR. DANN being requested to inform the Society,

1st, His reason for drilling four acres, and broad-casting only two;

2dly, Whether the six acres on which the experiment was made, were of a similar soil; and

3dly, How many times the drilled and broad-cast Turneps were hoed; and the difference of the expence, if any, per acre; with such further information as he may think proper to communicate; particularly,
whether

AGRICULTURE. 73

whether he drilled and broad-casted any land as an experiment, besides the above six acres; the following answers were received from him.

SIR,

I AVAIL myself of the first opportunity of noticing the receipt of your favour of the 6th instant, and answering the queries therein stated, made to me in consequence of the experiments I had the honour of transmitting you, for the consideration of the Society, to determine the comparative advantages of the drill or broad-cast method, in the cultivation of Turneps; and am very sorry to find I have not been so explicit as the Society wished; which, I flatter myself, would not have been the case, had I been aware of the reward offered by the Society.

I am, SIR, with respect,

Your obliged and obedient servant,

W. DANN.

*Gillingham,
May 8th, 1791.*

Mr. MORE.

ANSWER

74 AGRICULTURE.

ANSWER TO QUERY FIRST.

My reason for drilling four acres, and broad-casting only two, was merely accidental, six being ready when rain came. It might have been three, or ten; for, as I before observed, at that time I had not the least knowledge of the offer of the Society: my motive was solely to prove the difference, if any, with Mr. Cooke's machine; having two years before drilled several acres with Mr. Horn's, which did not answer my expectation: and my reason for broad-casting only two acres on the 6th, was not having more ground ready; but I continued to do so almost daily afterwards, as I could get out the manure, till I saw a manifest superiority in the drilled, for about a fortnight after they were up; from which time I drilled the remainder.

2d. Exactly similar and adjoining; the soil thin; at many parts of the field, not more than eight inches of indifferent mould on chalk.

3d.

3d. Once each by hand, and at the same price, six shillings per acre ; and from my observation, at the time of hoeing the drilled Turneps, I conceive I shall in future be able to reduce the price six-pence or one shilling per acre by the drill, as there is certainly less trouble to hoe those drilled, than those sown broad-cast.

I beg here to repeat what I stated in my former account, that the total number of acres I drilled in July last, was seventeen; sown broad-cast, fifteen; and that there was, throughout, a very visible difference in favour of the whole that were drilled : and I am so fully convinced, by my experiment, of the advantage of the drill, as are many of my neighbours who viewed the same, that we are determined to give up the broad-cast method,

The

The SILVER MEDAL was presented to Sir THOMAS HANMER, of Bettesfield Park, near Whitchurch, Shropshire, Bart. (see Vol. VIII. page 229) for his improvement of Waste Land, in North Wales; of which an account is contained in the following Papers.

SIR,

B EING desirous to lay before the Society for the Encouragement of Arts, Manufactures, and Commerce, an exact state of an improvement of Heath or Moor Land, in the county of Flint, in North Wales; I send you the following account, trusting it will meet their approbation.

The Society, knowing well the difficulty attending a work of this kind, have very properly affixed no given or certain time for the performance of what they require to be executed (viz. one hundred acres of waste
or

AGRICULTURE. 77

or moor land), so as to entitle any person to obtain the honorary satisfaction offered by the said Society; as that must in great measure depend upon the difficulties arising from the situation, barrenness, or inundation of the ground. We look upon the improvement hereafter mentioned as a matter of extraordinary exertion in the proprietor; and the more especially, as, at the same time that it contributes to the general good of the community, it affords a daily and constant subsistence, by the great increase of labour thereby necessary, to the indigent and industrious poor.

We beg leave therefore to lay before the Society the particular account thereof, as follows:

The proprietor, Sir Thomas Hanmer, Bart. about Michaelmas, 1778, did begin to inclose, drain, and plant a considerable part of the Heath, called the Fens-heath, within the parish of Hanmer, in the county

78 AGRICULTURE.

of Flint, which at that time lay in a thoroughly neglected state, a great part of it covered with water, and the other parts of it a wild grey sand, with strong heath, grig, or ling, growing thereon, and looked upon by the country in general (at the time of the undertaking, from its poverty and other circumstances attending it) as a mere chimerical scheme in the proprietor, that would never answer, though his expence, added to his perseverance, were ever so great.

That, notwithstanding this general opinion, the proprietor proceeded: He first began by a complete drainage, afterwards by parting it into inclosures, with banks and ditches. The part he aimed at more particularly for his experimental improvement, became thoroughly accessible and free from water, and in a short time after, although part of the ground was bog or morafs, was capable in a great measure of being worked upon by a team, and ploughed: some parts,
that

that would not then bear the weight of a horse, were obliged to be dug with spades: so that the whole surface of the part intended to be improved in the course of two seasons, became wholly turned under, and began to present to the eye of the traveller a much more pleasing, and, I may say, a more promising aspect. However, the country in general were not yet without their doubts of the success of it, and imagined the proprietor would yet abandon the scheme; but the work was still carried on, and pursued with spirit; and the mode of husbandry was as follows:

Frequent ploughings, the only method for improving this kind of Heath, as turning barren soil often to the sun has been found of very great use, thereby extracting from it that injurious moisture and damp in which it had lain, time immemorial, and at the same time sweetening and correcting its juices, thereby to enable it to support vegetation; which, in its natural state, it was totally

80 AGRICULTURE.

tally incapable of, as had been proved by experiment, without this preparative : so that the proprietor became convinced, that nothing but time, added to tillage, with some kind of manure brought thereon, would enable him to make his intended trial with effect. Some parts were completed for the crop by various ploughings : in other parts of it, the surface was pared and burned ; and the ashes, when spread, proved of considerable use as manure ; though this last process is most expensive, as the weather frequently hinders the work for many weeks together, if there comes a succession of rain. The proprietor, on the whole, found the plough and spade to be the most advantageous mode of converting this kind of soil to bring it in forwardness to receive manure, in order to attempt a crop.

The further method of tillage pursued, was to make fallows ; and if the season permitted, so that the ground could be cleared and burnt off, to destroy the grig or heath,
and

and other rubbish thereon, in due season ; then, with the assistance of fresh lime, to be flacked upon the land, spread immediately and ploughed in, to sow the same with Turneps, which, though a very precarious crop, if the season suits may turn out to great advantage ; and if they can be fed off with sheep, the better : when that could not be, from the wetness of the season, they have been drawn, and given to oxen in stalls ; by which an abundance of manure is produced to the farm. If the Turneps fail, the land, after being treated in this manner, is ready for rye, of which it was found, under this preparation, it would bring a very sufficient crop. Occasionally, French wheat has been tried, which is a profitable crop, if you let it remain for ripening ; and if not, by turning it under with the plough when it is in blossom, proves an excellent manure, preparatory for the red wheat, which must be sown upon one furrow in the same manner as upon clover-leys ; and after this, it will bring a tolerable good crop of oats, which

82 AGRICULTURE.

the proprietor never failed to sow with clover under, as land of this weak and thin nature must by no means be permitted to bear more than two crops without rest: and if any good marl can be had at a reasonable expence, it should then be well marled upon the clover root: where this cannot be had, any kind of clay is recommended; but it should not be spread fine, immediately upon putting on, but laid in large pieces upon the surface, until the weather has meliorated it, and flacked it down, which it will do by slow degrees, and make it much more enriching and beneficial. After it has had this covering, it will produce most excellent wheat, that will amply repay the expence of the marling.

The proprietor hopes that this account will not be thought too long and tedious, as he has added nothing but what struck him as materially necessary to lay before the Society: but, lest what he has here described should prove unentertaining, and
that

AGRICULTURE. 83

that no new lights in husbandry should appear to the Society from what is above stated, we say that, at the end of the year 1782, the proprietor had so far succeeded, and completed this work, to the astonishment of the neighbourhood, that he had, on different parts of it, good crops of wheat, rye, barley, oats, peas, clover, and turneps, in their different successions; that he was able to maintain, at the end of the before-mentioned period, a good stock of cattle upon the premises; and that he had, by thus persevering, completely worked over and cleared, in the time above specified, one hundred and twenty acres of this barren Heath; and that, in the year 1784, he let the same to a tenant at rack-rent, after the rate of ten shillings per acre; and that the same is now occupied, independent of any old land to assist it, maintains a large stock in excellent condition, and is daily increasing in value to the owner thereof. This, we hope, the Society will think at least worthy approbation, which will be highly flattering

84 AGRICULTURE.

to the proprietor; as it may prove a further encouragement to him, and others that may attempt the like improvements; and more especially at a time when the improvement of all waste lands is becoming the object of the Legislature; as, from this one instance, we are in great measure convinced of the practicability of converting any land, whatever the situation (if accessible with horses or oxen, and capable of being laid dry), to the public benefit, and thence, by the increase of labour and population, to add greatly to the power, strength, and riches of this happy and civilized country.

The above is an exact account.

THOMAS HANMER.

*Hanmer,
Dec. 20th, 1785.*

We certify the same to be a true state of the improvement above mentioned.

RICH. PARKES, Curate of Hanmer.

JOHN KYNASTON.

P. LLOYD FLETCHER.

To

To the Society for the Encouragement of
Arts, Manufactures, and Commerce,
Adelphi, London.

GENTLEMEN,

WE being desirous of communicating
to you the state and improvement
in planting, carried on by Sir Thomas
Hanmer, Bart. within the parish of Han-
mer, in the county of Flint, North Wales :
as we deem his proceedings on this mode
of improvement worthy the attention of the
Society; and as it perfectly accords with the
plan laid down in your Volume of 1785,
under Class 36, wherein you are pleased to
offer an honorary reward for inclosing and
planting with mixed forest-trees, ten acres
of land, to be completed between October
1784 and May 1786; we do therefore pre-
sume to lay before you the following exact
state of this improvement.

Sir Thomas Hanmer, Bart. being pos-
sessed of a tract of Heath, or Moor land,

G 3 called

86 AGRICULTURE.

called the Fens Heath, in the parish of Hanmer, within the county of Flint, in North Wales; amongst other experiments thereon made, was desirous of trying the success he might have in planting different sorts of forest-trees upon the above-mentioned Moor or Heath: accordingly he took in and inclosed ten acres and upwards of the said ground, between the times above specified, and planted the same with good plants of oak, ash, different kinds of firs, but mostly the Scotch, together with poplar, some lime, some horse-chestnut, and different kinds of willow: that the whole have succeeded exceedingly well, notwithstanding the drought of last summer; that he had this last winter completed what was left unfinished in the former season; and that the plants are now all in a healthy and flourishing condition, and most completely fenced with oak posts and rails; and bid fair to make fine, useful, and ornamental groves. And we do further certify to the Society, that Sir Thomas Hanmer hath
this

this spring interſet the ſame with acorns, to make up and ſupply any deficiencies that may happen by weather, treſpaſs, or other accident: the method which he has purſued, we apprehend, is done the more effectually, as the whole of the ground was double-trenched with the ſpade, as the ſureſt method, and is what he recommends to all gentlemen who may wiſh to ſucceed in planting upon the like ſort of uncultivated ground; as from experience he found that the land, from its poverty, without this preparation, was unable to ſupport and nourish the plants.

The plants that appear to grow beſt upon this kind of moor, or heath, are the oak and Scotch fir, which he begs leave to recommend as the moſt hardy, and likely to ſucceed in places that are in their nature poor, and much expoſed to cold or northern aſpect. This account, we hope, will prove acceptable to the Society, and that they will agree with us in thinking that the

88 AGRICULTURE.

owner has some degree of merit by accomplishing this his undertaking, attended with considerable expence; which, if deemed worthy approbation, we are confident will be highly gratifying and flattering to the proprietor.

This is an exact account.

THOMAS HANMER.

We certify the same to be a true account of the improvement above mentioned.

RICH. PARKES, Curate of Hanmer.

JOHN KYNASTON.

P. LLOYD FLETCHER.

*Hanmer,
April 9th, 1786.*

The

The three following Papers having this year been received, in claim of the Premium offered for Stocks of Bees; SEVEN GUINEAS were voted to Mrs. MARGARET CLIFTON, TEN GUINEAS to Mr. GEORGE HUBBARD, and TEN GUINEAS to Mr. THOMAS MORRIS.

IN the Eighth Volume of your Transactions, a premium is offered, Class 108, for the greatest number of Stocks of Bees, not less than thirty. I having that number in my possession, am induced to make my claim for the same.

My mode of raising them, has been as follows: About fifteen years ago, I bought one stock of Bees, and, having great success, increased the number by degrees, till I had thirty stocks; and should have sent a claim last year, had I known there had been a premium for them. The method of keep-
ing

ing them, is in a straw hive, standing on a stone, supported by three oak stakes, about eighteen inches high, the stone to project a few inches over, to prevent mice from destroying them; also a covering, made of wheat-straw, fixed over each hive, to prevent the rain from entering therein.

The method of keeping them alive in winter, is by feeding them with honey every other day, from the beginning of December to the latter end of March. Warm the honey, and pour it into plates, and lay upon it clean wheat-straws, near to each other, to prevent the Bees from being drowned in the honey: they will sit upon the straws, and take the food clean from the plates.

MARGARET CLIFTON.

Timberland Thorpe,
July 27th, 1790.

Witnesses to the truth of the above,

W. BROADBENT, Vicar of Timberland
FRANCIS WARD, Timberland
JOHN FISH, Surgeon, Sleaford.

S I R,

SIR,

AGREEABLE to your request, I beg leave to inform the Committee of Agriculture, that the signature of my name to the certificate granted to Margaret Clifton, of Timberland Thorpe, is my handwriting.

I am, SIR,

Your obedient servant,

WM. BROADBENT,
Vicar of Timberland.

Timberland,
Dec. 24th, 1790.

Mr. MORE.

SIR,

AS I am induced to become a candidate for the premium offered for Stocks of Bees, Class 108, I beg leave to communicate to the Society the following experiments;

experiments ; the result of which, I flatter myself, will afford some information towards the management of those useful insects. In my early acquaintance with these entertaining creatures, my endeavours to increase my stock were continually disappointed, particularly in the early months, by saving moderate stocks ; which was a matter of surprise to me, as my strong stocks thrived amazingly, whether I kept them for work or swarming.

Now, to ascertain the matter with sufficient accuracy, I determined to sacrifice three hives every year, one strong, and two moderate ones. Accordingly, on the first of February, I suffocated a strong hive, after Thornley's method ; and when I took out the combs, it surprised me much to find an abundance of brood : the eggs and maggots were innumerable, and many were next to emerging from their cells.

It

It was then obvious to me, that the queen had begun to lay her eggs in the early part of January; and this appeared the more extraordinary, as the month of January had been very cold, from severe frosts and snow; and it was evidently too sharp for a Bee to stir abroad.

This circumstance refutes the general received opinion, that the queen never begins breeding till the weather proves mild, and you see Bees carrying to their hives, the little balls of farina on their legs: but to investigate the matter more fully, there appeared in the combs, vast quantities of farina; and what was very curious, some of it seemed covered with a kind of varnish substance, in order to exclude the air from it; besides, on the top of the hive, there was a considerable quantity of water, apparently collected there from the same cause that it does on a window, where a room is hot, and the external air very cold. The foregoing consideration clears up a point that

that has puzzled many authors; I mean, the laying up such quantities of farina: White, and some others, suppose it to be real food, mixed with honey, for the old Bees.

The second hive, which had not above three pounds of honey in it, I suffocated on the first of March; the queen of which stock had not produced a single egg: the third stock I examined the first of April, and there likewise found no eggs. In the second year, I repeated the same experiments with the strong and weak hives as before, and the result was the same in every respect.

But the third hive I reserved till the 20th of April, by which time they begin to gather honey from the gooseberries: on examining this hive, I found some eggs produced. Let it be observed, that this hive I was under the necessity of feeding, to keep them alive.

I cannot

I cannot in this place forbear taking notice of the surprising foresight which these wonderful insects seem to be endowed with: in the weak hive, not a single egg is produced, till honey-gathering commences; but in the strong hive, the increase of young Bees is there carried on with surprising avidity at a time when they are generally supposed to be in a torpid state; and this increase is perfectly safe in a strong hive, for they are never observed to work in the early months, as weak hives do.

From the above experiments, it is evident you gain almost four months between the two stocks: besides, early in May the strong stock is almost ready to swarm; whereas the weak hive, by its prodigious decrease, occasioned from their constant working, and no young ones being bred, generally dwindles to nothing. Once, on a hot day in April, I had five of these weak hives driven out by plunderers, with their
different

96 AGRICULTURE.

different queens; for the strong stocks never let the weak ones rest, when they find the latter are much reduced.

Sometimes, if the months of March and April happen to be cold and wet, so as to prevent their going out, a little feeding may give them sufficient strength to defend themselves; but those stocks seldom turn to any account: hence the reason why keeping Bees in colonies have always failed; I mean, in this country; for, if you imprudently reduce your Bees, by taking too much honey from them, so as to prevent the queens breeding in the early months, they must miscarry in the following summer. I cannot help condemning two authors, that have written on this subject, viz. Messrs. White and Keys, particularly the former: their opinions have given a surprising check to the cultivation of Bees; I mean, their idle notions respecting situation.

A popular

A popular opinion prevails with us, that no village will support more than eight or ten stocks; consequently, the villages in our country do not contain above ten old stocks, one with another; whereas I am confident that twenty times the number might be kept. But let us examine what Mr. White has written on this business: he directs you to swarm your Bees, and the same year to take part of their honey from them.

Now it is well understood, that it requires a large swarm, aided with a fine season, to make them produce five and twenty or thirty pounds weight in October; which weight is absolutely necessary for their future welfare: he also affirms, that if you leave them eight or ten pounds of honey in August, it will very well support them through the winter. Further comments on such management are needless, as the reason of his failure is too obvious to require

quire the thought of a bad situation, to account for it.

Keys seems to have copied his sentiments respecting situation ; but from what I have advanced in regard to keeping such a number of stocks, it may be necessary to examine what the Bees collect from. I will first mention the Tare, that inexhaustible support to Bees, from which they gather the whole summer ; and it may not be improper here to note, that it is not from the flower, but a small leaf * with a black spot on it, which in warm weather keeps continually oozing. But from careful inspection at the time of their gathering, this nectareous juice may be seen oozing from every joint of the stem. A hundred acres of tares are grown every year within the reach of my Bees ; yet it was always said to be a bad situation, and not able to support more than eight or ten stocks : besides, if the
month

* The *Stipula*, or leaf scales, which are marked underneath with a spot, as if it had been burnt.

month of June proves hot, the collection from the oak, lime, and sycamore leaves, is astonishingly great; as well as from the profusion of flowers, which nature exhibits in succession throughout the whole summer.

From these remarks and experiments it is evident, that success depends entirely on leaving your Bees strong in October; for by this plan they naturally get into a habit of swarming early, and, by having the whole summer before them, always get rich. Whenever an unkindly season happens, to prevent this, it is an invariable practice with me, to give all my swarms sugar and water, or honey, sufficient to make each stock produce thirty or thirty-six pounds weight: besides, I am never disappointed of a swarm in May; and it is more frequent than otherwise, that these stocks will yield three swarms each; the old stock likewise in general will be as rich as the prime swarm. On the other hand, if the stock is

left moderate, though they may have honey enough to get them through the winter, yet some check may be given to the queen's breeding; of course it may be the middle of June, before they are ready for swarming; and if the weather turns out fine and hot, there is such a profusion of honey in the fields, and they are so intent after it, that no art can make them swarm: in that case, they will lie out the remainder of the summer, to the great loss of the owner. However, whenever this happens, I would advise all such stocks, after laying out a week, to be set on empty hives.

I will now presume to offer a simple and easy mode of managing these admirable insects, the profits from which will far surpass that in common use. The owner must patiently wait till he has acquired twenty stocks, which may be soon accomplished by attending to the foregoing hints. In the month of April following, he must separate ten of the strongest hives for swarming;

swarming; the other ten must be raised on large empty hives, the tops of which should be first taken off, and the joinings of the two hives secured with a little clay, which plan keeps the Bees from swarming. In the month of September following, being the time I would recommend them to be burnt, each stock will seldom be found to have produced less than fifty pounds weight, provided it has been a kind season.

The prime swarms from the other stocks, I would recommend to be put into three-peck hives, at least; for when they swarm so early, they are very likely to swarm again in a few weeks, which should always be prevented: and all the after-swarms should be united, two or three into one; for the great advantage arises from the large quantity of Bees being kept together, since by that mode ten stocks will generally yield fifteen good ones. But the greatest check to the cultivation of Bees happens from in-

clement seasons: I have experienced some summers, when it has rained, almost all the months of June and July, that not above one prime swarm in ten have been able to get a sufficiency; this is really distressing; and on these occasions, I have seen the stocks of villagers wholly swept off.

This is another reason why double hives are so necessary; for, besides the great profit arising from them in fine seasons, it would prevent the decrease of stocks, which must unavoidably happen in bad seasons. In the most unkindly summers, they are sure to get enough to support them through the winter: whenever it happens so, they should stand till winter; and in a frosty day, the clay should be removed, and a wire drawn between the hives, to separate them; for by this time they will be all in the upper hive; and these stocks should be reserved for swarming the following summer.

From

From a review of the above experiments, the reasons are obvious, why people are so frequently disappointed in the management of Bees, especially in the modern way; but, on the other hand, it shews what a surprising state of cultivation they might be carried to: and supposing they could be brought to a state of cultivation, that ten poor families in a village could keep twenty old stocks, besides their own profit, it might become a national concern. Great pains have been taken, and still greater encouragement offered, for a plan to preserve the lives of these useful and sagacious insects; which may be done by the intelligent, but cannot be expected from the cottager.

My stock consists of forty hives and boxes. The method I pursue in the management of Bees is, to reserve part of my stocks for working; for, by giving them room, they seldom swarm: and I always work them upwards; for, by that means,

H 4 the

104 AGRICULTURE.

the queen is kept in the under hive or box; and the honey so collected is of the purest quality.

But it is no easy thing to make them ascend, to work through holes or bars so recommended by authors, as I have frequently known them swarm before so doing. My way is: if it is a hive, I take a piece out of the top, with a knife and chissel, ten inches diameter: thus, by laying a large surface of their comb bare, I am never disappointed.

But they will be induced to rise sooner, by placing a piece of empty comb, so as to reach from their own to the top of the box or glass globe that is intended to be used: whenever it so happens, in wet summers, that each stock cannot get more than thirty pounds of honey, I always use Mr. Thorley's method, with the fungus*; and I cannot help

* His book directs you to put it into a paper, pressing it down close, and immediately to put it into a flow

AGRICULTURE. 105

help being surpris'd that this simple method should not be commonly us'd, to save the lives of these useful insects.

I am, SIR,

Your very humble servant,

GEORGE HUBBARD.

*Bury St. Edmunds,
October 29th, 1790.*

Mr. MORE.

THIS is to certify that Mr. George Hubbard, Surgeon and Apothecary, of Bury St. Edmunds, in the county of Suffolk, had in his possession, this present spring, 1790, thirty hives of Bees; and by the month of May, this present year, has increased his stock to forty hives; and being desirous of sending an account of the management of his Bees to the Society for
the

a slow oven for a night; but I have always found it, when thus prepared, to burn with great difficulty: whereas, if it is gathered in the early state, and hung up a week to dry by degrees, and then put into a slow oven, it burns remarkably well.

106 AGRICULTURE.

the Encouragement of Arts, Manufactures,
and Commerce; we the undersigned have
subscribed this Certificate.

T. H. CULLUM.

W. MATHEW.

Bury,
Oct. 29th, 1790.

SIR THOMAS CULLUM's respectful compliments to the Committee of Agriculture; and, according to their request, signified by Mr. More, their Secretary, he acquaints them, that he signed Mr. George Hubbard's Certificate, certifying the number of hives of Bees he had in his possession.

Bury,
Dec. 15th, 1790.

Mr. MORE.

To

To the Society for the Encouragement of
Arts, Manufactures, and Commerce.

AMONG the Premiums for 1790,
Class 108, one is proposed for the
most satisfactory account of the managing
and preserving of Bees, to the best advantage
for collecting honey.

If gentlemen would but ornament their
gardens with so noble a piece of furniture
as an apiary, properly situated and carefully
managed, they might be furnished with the
valuable article of honey, without adulteration,
and also wholesome mead little inferior
to foreign wine.

Give me leave, Gentlemen, to lay before
you the method of managing my own Bees,
of which many ladies and gentlemen have
been eye-witnesses, and have been served
by

108 AGRICULTURE.

by me with as good honey as any in England.

In April 1789, I had twenty-one stocks of Bees, all in good condition, and wanting no feeding: the spring being friendly, they began to swarm in the middle of May, and continued till the latter end of June; and at that time I had about fifty swarms, notwithstanding I endeavoured to prevent such an increase, by glassing them; but many of the stocks swarmed before the glasses or small hives were full, for the mothers of all the stocks bred a prodigious quantity of working Bees, which was the reason of their swarming so many times. What I call a Mother, most writers on bees call a Queen; but I am clear that she is the mother of the whole empire or stock, and suffers none of the royal seed to live, except what are intended to go forth with the young swarm, and a sufficient quantity of drones, which are the males, and sit upon the eggs, as the mother lays them, in the cells prepared

pared for that purpose; while the working Bees continue their labour in gathering honey and wax. I have often seen the drones sit in a formal manner over the combs, where the brood is hatching, while the other Bees were very busy at work.

What I mean by a stock of Bees, is an united company, consisting of three sorts, viz. a mother, a great number of working bees, and some drones: and they are congregated within themselves, by a strict union, and defend their hive or box from any molestation; for the working Bees would instantly resent an injury, with the fury of their stings.

My own hives are made in the following manner: nine inches deep, and fourteen diameter, containing each about five Winchester gallons, with a flat top made of well-seasoned deal, an inch thick, four holes at the top, one exactly over the mouth of the hive, the other three in a right angle; viz.

Take

Take an inch centre-bit; make three holes as near as possible, so that you have but a small partition of wood between them; let them be made smooth and neat; then take a circular piece of half-inch board, tack it over those holes which are made in the hive, and let them be made to fit so close that no moth can get in among the young Bees: so that, when a swarm is put in one of these hives in May, or the beginning of June, and begins to fill the hive with combs, brood, &c. which you may easily perceive, by means of small pieces of glass, three inches square, put in the back of the hive, to observe their operations, and the Bees have filled their hive, and appear very busy at the mouth, open gently the hole on the top next the mouth, or rather right over the mouth, and place a proper glass over the hole, with proper sticks placed in the glass for the Bees to hang their work upon; otherwise they would be a long time filling their glass, which if they kindly
take

AGRICULTURE. 111

take to, they will fill in twelve or fourteen days.

But if your stock still increases, and, perhaps, lies out at the mouth of the hive, you must open a second hole at the top, and then a third, and so on to the fourth, if the Bees increase, and continue to lie out at the mouth: and yet for all this, many of my hives have swarmed, and left their glasses, &c. half full of honey.

Here give me leave to observe, that nature steps in to preserve the Bees, when all other efforts are ineffectual. The Bees have swarmed, settled on a bush, or about a tree, where there is no hope of their living without being hived; as they have left a good home, well stored with honey, and settled where there is none, and where they cannot make any. This has been the case last summer; for the mothers of the Bees, through the kindness of the season, have bred great quantities, so that we had a great many

112 AGRICULTURE.

many poor stocks that wanted feeding in the months of October and April.

This summer many complain of having what they call bad luck with their Bees, and say honey will be scarce; but, thank God, out of seventy-six or seventy-seven hives, I have had as follows :

	lb.
Glasses and small hives filled, thirty-	
one, weighing, - - -	153
Virgin honey, - -	160
Stock or common honey, -	125
	<hr/>
	438

This I call a good year, though some have been better. I have also furnished many gentlemen and ladies apiaries with bees, and have now thirty-seven good stocks for next season, besides an increase of sixteen stocks, and the honey above mentioned. My bees are, for the most part, well situated for collecting honey, and also
for

for fwarming, viz. in the parishes of Isleworth and Twickenham, in Middlesex.

I never intend to prevent my Bees from fwarming, but leave them at liberty to swarm, or not to swarm. Those stocks, the mothers of which do not breed so fast as others, of course cannot swarm so early; therefore I put on them glassess, or small hives: if the stocks so glassed keep working without fwarming, you most likely will get sixteen or seventeen pounds of honey in a month's time, and save all the bees alive; and such a stock will, except by accident, make a good stock next season.

My hives, made as before described, have a board at the top, seventeen inches wide, that is a full inch wider than the outside of the hive, that one may stand on another; and thus you may make complete colonies of Bees with a small expence, for three hives make a complete colony. When hives

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are

114 AGRICULTURE.

are made in this manner, they cost but 12s.
but in octagon boxes, 1l. 10s.

I much prefer straw hives, well made, to wooden ones, because the joints of the wood often give way, by being exposed to the weather and the sweat of the Bees; and the moth-fly (the greatest enemy they have) gets in and lays her eggs in the comb, and the warmth of the Bees hatches them to their own destruction; therefore straw hives are preferable, as well as cheaper than wood.

My method of managing straw hives is thus: when I make use of an old straw hive, I dip it into a copper of boiling water, so that, if there should be any moths eggs, they must be destroyed; but I let the hive be perfectly dry, before I use it.

Hives should be well made, and closely sewed together; but many are sold, not worth using.

The

The best situation for the houses is a little to the west of the south; for the sun shining into the mouth of the hive, too early calls the Bees abroad, before the cold stream is exhaled from the flowers, and the vernal juice turned into honey: but in this situation the sun will reach the front of your Bee-house about nine o'clock. I would have the front of the house leaning a little inwards, that the mouth of the hive may fit close to the mouth made in the boards, which should be three inches long in summer, and one in winter, and about one fourth of an inch high, the better to keep out cold and the bevering moth, which you may often see, at the latter end of August (when the working of the Bees begins to decline), standing at the mouth of the hive, bevering their wings as if just flying in among the Bees: they there lay their eggs, and with the wind of their wings fan them within the hive; and the warmth of the Bees hatches them, to their own ruin. In October every stock should

be well examined, and all the maggots brushed out, to prevent danger: for the grub or maggot forms a chrysalis, with a covering so strong, that the Bees cannot displace them; and in the spring they creep out of their little sepulchres, and spin a thin web before them, as they march up into the hive among the combs; and the Bees endeavouring to dislodge them, are entangled in the web, and there die: and thus, for want of a little trouble, many stocks are destroyed.

To cleanse the hive of these maggots, it must be turned up, and the dust and vermin picked out, and then gently set down in its place. If your Bees are well, and in a condition to stand the winter, and have a mother with them, they will sting, otherwise not unless you hurt them: however, a yard and a half of Scotch gauze, sewed round the brim of your hat, and then tied round the waist, having holes for your arms, will completely secure your face.

The

The hive should be also brushed on the outside very clean, and washed all over with a sponge dipped in brine made with clean salt; a small quantity of lime and hair, made fine, should be put round the bottom, and the hives be covered with hay or haybands; for straw may contain some corn which may attract the mice, who may gnaw the hives.

I have mentioned how the front of the house should be formed, by setting the front board, which the mouth of the hive stands against, on the inside; but let the roof be made so as to keep the entrance dry, for a foot, before the mouth: the back-shutter, folding doors, and ends of the roof, should be made very close, to prevent any vermin entering the house: the first floor, or bottom of the house, should be about two feet and a half from the ground, in such places as gardens or orchards; but, on the side of a hill, or where the Bees have no obstruction from hedges, &c. it may be but eighteen inches. As Bee-houses cannot be very ex-

118 AGRICULTURE.

penfive, I would have a house made but for four hives, the second floor two feet from the bottom, and the roof two feet from the second floor; but the second floor may be made moveable, in case you wish to form your Bees into a colony, and then you will want the whole depth of your house.

I confine them to four stocks in a house, because I find, when they are too close, they are apt to rob one another; but when there are but four stocks in a house, I have observed one turn out to the right, and the other to the left.

If more than one house be required, they should be placed ten or twelve yards distant, which may be done by driving a strong stump into the ground, and placing on it a piece of elm or oak plank, two or three inches thick. The hives must never be covered with rags, for they are apt to breed moths: the upper and lower floors should be two or three inches thick.

I come

AGRICULTURE. 119

I come now to my method of feeding them, which, I think, is new. Sink a cavity in the middle of the floor, about six inches diameter, like a trencher, deep enough to hold a quarter of a pint of honey, and no more: if the cavity be too deep, the Bees may be suffocated. A channel must be made from the outside of the floor, to communicate with the cavity; and a piece of wood to fit close into it, to keep out the vermin.

If your Bees do not weigh sixteen or seventeen pounds, exclusive of the hive, they must be fed in September, October, March, and April, and sometimes in May: they must not be fed in cold weather, for that calls them from sleep, and they then never return to the hive again: nor must they be fed in the sunshine; for when the honey smells strong, it sets them quarrelling and fretting, and the strong injure the weak. The best time is evening, when I take the piece of wood out of the channel, and gently pour a quarter of a pint of honey

into the cavity : if the honey will not run freely, I boil up four or five pounds with a quart of strong sweet-wort, which brings it to a proper liquid. This food will be of great service to the mothers, and make them lay eggs in abundance in the spring.

If a stock has been glassed two summers, it should not be worked a third ; but if it increafe, take a new hive, or a clean old one, and take off all the covers from the top of the hive : let it be stuck the same as if you was to have a new swarm ; place it on one of the floors ; and having opened the hole on the top nearest the back, place a piece of lath diagonally from that hole to the side of the mouth ; let it be made fast with pegs, not nails, lest the honey be stained ; then place the old hive upon the new one, and stop the old mouth close ; and the Bees will then gradually work down the new hive : that will give them sufficient room for the summer. And next spring, take another clean hive, and place the two upon it, in the same manner

manner as before: this will serve for the next year. Now having had no honey for two years, the upper hive will most likely be full, and may be taken away as follows:

With a strong chisel separate the top hive from the other two; and in a fine day take it away, twenty or thirty yards, and place it on the ground bottom upwards; and secure the holes on the top of the second hive.

The Bees no doubt will rage; but you must secure yourself with gauze, as before directed, and wear black stockings, for that colour is least observed. Place a table even with the mouth of the lowest hive, and spread a cloth over it, near the mouth, and by this time the greater part of the Bees that were out will have come home: the middle hive being the breeding-place, it is most likely the mother is in that; but if she was in the top, she may yet be safe. Place a clean hive, of the same diameter as that
you

you have taken away, upon it; then tie a cloth over both (glasses and all, if there be any) so tight, that the Bees within may be in darkness: let them remain thus half an hour; then, with a stick, rap the bottom hive, but not so hard as to injure the combs; continue rapping half an hour; then untie the cloth, and take away the upper hive, into which the noise has driven the Bees, and place it on the table and cloth from whence you took them, and shake them out on the cloth, and they will run into the mouth of their proper hive. If necessary, repeat this operation, and all the Bees will be saved: this saves the trouble and loss of smothering them with sulphur, as was the custom; and the Bees, in one day, will forget the injury, and work as usual. But in case but little honey is left in their two hives, they must be fed; thus, in two hours, your honey may be taken, and the Bees preserved: the honey you have obtained in this way may be dark, but will make excellent mead; but better and brighter will

AGRICULTURE. 123

will be produced by those which work in glasses.

Hives will not be beneficial in barren countries ; but should be near gardens, shrubberies, orchards of cherries, or farms, where clover, beans, saintfoin, or French wheat, grow. Lime-trees, or green-house plants, set out in the spring, orange or lemon trees, are useful, and produce excellent honey : where there is room, it is worth while to plant gooseberries, currants, sweet marjoram, peppermint, or the like.

Though I am not for preventing Bees from swarming whenever they are inclined, yet I acknowledge that it is sometimes necessary to destroy some stocks.

If they have lost their mother, and neither swarm nor work much, they should not be kept.

The

The moth, or other accident, will sometimes spoil them, and then they should be destroyed.

My neighbours say, that, when I die, the Bees will lose the most compassionate master in this kingdom. Indeed I, however, have destroyed none but from necessity, and have been for near twenty-four years remarkably successful.

I have now forty stocks in good condition, though the loss of mothers, or some unforeseen accident, may happen to some before summer.

The loss of a mother may be known, by the bees ceasing to work, and mourning incessantly: they will sometimes in that case leave their hive, and try to force themselves into one that is near.

This circumstance should be noticed; for the old hive may be well stored, and when they

they have left it as a residence, they will yet return with their companions, and carry away the honey : some, for want of observing this, have wondered how a heavy hive, that has been left, has become light.

But though the mother be lost, if there be eggs, they will sometimes stay and hatch them ; and if any royal seed be among the eggs, they may survive, and become a good stock ; but this is not often the case.

About a month ago I was desired to look at five stocks at Richmond, in order to purchase them : one of the heaviest was without a mother. I purchased that, and one more, where the mother was lost : I found twelve pounds of honey, but no eggs, and therefore the Bees would not have staid long : the other three were old, and the honey black, and therefore of no use but to stand and swarm another year.

If

If Bees continue in one hive for four or five years, they always degenerate, and become both fewer and weaker: the reason is, the combs for breeding are generally made on purpose, and larger than the rest; every time a bee is hatched in one, a skin or coat is left behind which reduces the size; and in time it becomes too small to produce a bee of its proper dimensions, and occasions a necessity for their having frequently new habitations, which they will always accept, if you provide them a good situation and clean hives.

My situation is a good one, by accident, or otherwise; for I could not have afforded to have made it so by planting.

In the parish of Isleworth, twenty-four years ago, there were not ten stocks of Bees; and now, through the approbation of my management, there are more than two hundred.

I hope

AGRICULTURE. 127

I hope what has been thus simply stated may be worthy your attention, and that I may be admitted a claimant.

My LORDS, and GENTLEMEN,

I am your most humble
and obedient servant,

THOMAS MORRIS.

No. 20, *Battle-Bridge*.

To the Society for Encourage-
ment of Arts, Manufactures,
and Commerce.

SIR,

I RECEIVED yours. You will please to inform the Committee, that I signed Mr. Morris's Certificate, and am willing to testify, that he has at this time upwards of thirty stocks of Bees.

I am, SIR,

Your very humble servant,

FRANCIS SWINDEN.

Brentford,
Dec. 15th, 1790.

Mr. MORE.